DELAWARE RIVER BASIN
BRANCH OF HOLBERT CREEK, WAYNE COUNTY

PENNSYLVANIA

BAYLY POND DAM

NDI ID NO. PA-00343
DER ID NO. 64-205

GEORGE W. BAYLY, ROBERT BAYLY & ERNEST KANNENGEISSER

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

Prepared by
Geo-Technical Services, Inc.
CONSULTING ENGINEERS & GEOLOGISTS
851 S. 19th Street
Harrisburg, Pennsylvania 17104

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For
DEPARTMENT OF THE ARMY
Baltimore District, Corps of Engineers
Baltimore, Maryland 21203

JULY 1981

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DACW31-81-C-0019

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Baltimore District, Corps of Engineers
Baltimore, Maryland 21203

July 1981

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonable possible storm runoff), or fractions thereof. The spillway design flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

BRIEF ASSESSMENT OF GENERAL CONDITION

AND

RECOMMENDED ACTION

Name of Dam:	Bayly Pond Dam NDI ID No. PA-00343 DER ID No. 64-205
Size:	Small (11.7 feet high; 51 acre-feet)
Hazard Classification:	Significant
Owner:	George W. Bayly, Robert Bayly and Ernest Kannengeisser R.D. #4, Honesdale, Pa. 18431
State Located:	Pennsylvania
County Located:	Wayne
Stream:	Branch of Holbert Creek
Date of Inspection:	March 3, 1981

The Bayly Pond Dam is judged to be in good structural condition based on the visual inspection. Based on the location of the downstream dwellings and the fact that a few lives could be lost should the dam fail, the dam is classified as a significant hazard dam. Based on criteria established for these studies, the recommended Spillway Design Flood (SDF) varies between the 100-year flood and 1/2 of the Probable Maximum Flood (1/2 PMF). Because of the small reservoir storage capacity, the 100-year flood was selected for the SDF. Since the spillway cannot pass the 100-year flood without overtopping the dam, the spillway is rated as inadequate.

The following investigations and remedial measures are recommended for immediate implementation by the owner. All investigations and design of remedial measures should be performed under the direction of a Professional Engineer, experienced in the design and construction of dams.

(1) Increase the spillway capacity to pass at least the 100-year flood flow without overtopping the dam and the dike.

(2) Stabilize the upstream face of the dam against wave erosion.

(3) Verify the operational condition of the intake valve and provide other means to draw down the reservoir level in emergencies, should the valve be found inoperative.

In addition, the owner should institute the following operational and maintenance procedures.

(1) Develop an emergency warning system which should include round-the-clock monitoring of the dam during periods of unusually heavy rains and plan to contact the few downstream residents who would be affected by a dam failure.

(2) Institute an inspection program to include monitoring the existing depressions on the downstream slope of the dam and periodic operation of the outlet works to insure that a method of drawing down the pool is available and operable. As presently required by Bureau of Dams and Waterway Management of PENNDER, the program shall include an annual inspection of the dam by a Professional Engineer, experienced in the design and construction of dams. Deficiencies found during annual inspection should be remedied as necessary.

Submitted by:

GEO-TECHNICAL SERVICES, INC.

Gideon Yachin

GIDEON YACHIN, P.E.

Date: July 10, 1981

Approved by:

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, CORPS OF ENGINEERS

James W. Peck

JAMES W. PECK, COLONEL
CORPS OF ENGINEERS
COMMANDER AND DISTRICT ENGINEER

Date: 3 Aug 81

BAYLY POND DAM (PA. - 00129)

(LEVEE IN BACKGROUND, ALONG ROAD)

OVERVIEW

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

BAYLY POND DAM

NDI # PA-0343, PENNDER # 64-205

SECTION 1

GENERAL INFORMATION

1.1 General.

a. Authority: The inspection was performed pursuant to the authority granted by the National Dam Inspection Act, Public Law 92-367, to the Secretary of the Army, through the Corps of Engineers, to conduct inspections of dams throughout the United States.

b. Purpose: The purpose of this inspection is to determine if the dam constitutes a hazard to human life or property.

1.2 Description of Project.

a. Dam & Appurtenances: The Bayly Pond Dam is an earthfill structure terminating in earthen abutments. The dam has a maximum height of 11.7 feet and has a total length of 521 feet. The spillway is a 16 foot wide excavated earth channel in the left abutment. The outlet works is reported to consist of a small concrete intake box with a trash rack and manual slide gate. The intake box is connected to a 6-inch diameter steel pipe which has a gate valve located near the intake box. Flow through the 6-inch pipe is conveyed downstream through a 10-inch diameter steel pipe. A 12-inch steel riser pipe is also connected to the 10-inch outlet and serves to release low flow discharges from the reservoir.

There is an earthfill dike located approximately 120 feet south of the main dam. The dike is 250 feet in length and has a maximum height of 4.8 feet.

b. Location: The dam is situated on a branch of Holbert Creek in Berlin Township, Wayne County, Pennsylvania. The dam's location is approximately 1.5 miles east of Laurella, Pennsylvania, and is on the White mills USGS 7.5 minute Quadrangle Map at Latitude 41^{o}-36.0' and Longitude 75^{o}-10.9'. A Location Map is shown in Exhibit E-1.

c. Size Classification: Small (11.7 feet high, 51 acre-feet).

d. Hazard Classification: Significant (see paragraph 3.1e).

e. Ownership: Mr. George W. Bayly, Robert Bayly and Ernest Kannengiesser, R. D. #4, Honesdale, Pennsylvania 18431.

f. Purpose of Dam: Recreation.

g. Design and Construction History: The dam was constructed in 1961 by Maynard Freeman, R. D. #4, Honesdale Pennsylvania. No design drawings, computations or "as-built" drawings are available.

h. Normal Operating Procedure: The 12-inch riser maintains the pool at low flow. The gate valve and slide gate are normally closed.

1.3 Pertinent Data.

a. Drainage Area:	0.12 mile
b. Discharge at Dam Site (cfs):	
Maximum known flood at dam site	Unknown
Outlet conduit at maximum pool	3 cfs
Total spillway capacity at maximum pool	13 cfs
c. Elevation (USGS Datum feet): See paragraph 3.1a for datum.	
Top of dam	1396.5
Top of dike	1395.8
Maximum Pool	1395.8
Normal Pool (see paragraph 3.1c (2))	1395.4
Upstream invert outlet works	Unknown
Downstream invert outlet works	1384.8
Streambed at center line of dam	Unknown
Maximum Tailwater	Unknown
Downstream toe	1384.8
d. Reservoir Length (feet)	
Normal pool level	900+
Maximum pool level	910+
e Storage (acre-feet)	
Normal pool level	45
Maximum pool level	51
f. Reservoir Surface (acres)	
Normal pool level	13
Maximum pool level	17
g. Dam	
Type	Earth
Length (dam)	521 feet
Length (dike)	250 feet
Height (dam)	11.7 feet
Height (dike)	4.8 feet
Top width (dam)	10 feet
Top width (dike)	9 feet
Side slopes:	
Dam Downstream; Varies from 2.7H:1V to 5H:1V	
Dam Upstream; Approximately 3H:1V	
Dike Downstream; Varies from 5H:1V to 12H:1V	
Dike Upstream; Approximately 3H:1V	
Zoning	None
Impervious core	None
Cutoff (reported by owner for both dam & dike) 3 to 5 feet deep, 8 feet wide trench.	
Grout Curtain	None

h. Regulating Outlet

Type - A slide gate on intake box followed by a 6" diameter gate valve on a section of 6" diameter steel pipe. Both are submerged and discharge to a 10" diameter steel outlet pipe.

Length	60± feet

Access - By diving from dam crest

i. Spillway (Emergency)

Type - Excavated earth - Trapezoidal

Length of crest	16 feet
Length of outlet channel	100+ feet
Crest Elevation	1395.4
Gates	None
Upstream channel	Earth
Downstream channel	Earth

j. Spillway (Service), as reported by owner.

Type - 12" diameter steel riser pipe at the upstream end of a 10" diameter outlet pipe.

Crest Elevation (reported 12" below emergency spillway crest)

SECTION 2
ENGINEERING DATA

2.1 Design.

There is no available information relative to the design of the dam.

2.2 Construction Records.

The dam was constructed in 1961 by a local contractor, Mr. Maynard Freeman. A verbal description of the facilities was given by the owner.

2.3 Operation.

Non-documented.

2.4 Other Investigations.

No other documented investigations were available for use in evaluating the dam.

2.5 Evaluation.

a. Availability of Data: There are no plans or other information available on the design and construction of the dam.

b. Adequacy: In the absence of design plans, specifications, or construction records, assessment of the dam and its safety must be based on the visual inspection and the Hydrologic and Hydraulic analysis presented in Section 5.

SECTION 3
VISUAL INSPECTION

3.1 Observations.

a. General: The overall appearance of the dam and appurtenant dike is good. A plan of the dam and annotated field observations are shown on Exhibit A-1, Appendix A. Surveyed profiles and typical dam and dike sections are presented in Exhibits A-2, A-3 and A-4. The survey datum for this inspection is based on interpolation of the USGS Contour Lines (see Exhibit E-1). On the inspection date (3/3/1981), the pool was at elevation 1395.5, approximately 0.1 foot above the spillway crest. Pertinent observed features are indicated on the photographs in Appendix C.

b. Embankments: The earth embankments of the dam and dike appear generally sound. The upper 3' of the embankment on the pond side has been eroded by wave action. Softening of the embankment by cattle coming to drink water has aggravated this situation. No seepage areas were observed at the toe of the slopes or at the junction of the abutment and embankment. Marshy areas exist below the toe of both the dam and dike. According to the dam owner, the marshy areas existed prior to the dam's construction. Four shallow drainage ditches have been dug to drain the marshy area. Two 3-foot diameter shallow surface depressions are located on the downstream face of the dam, 70 feet right of the outlet pipe. Although there was no evidence of internal erosion or "piping" downstream of these depressions, they should be monitored (see paragraphs 6.1a and 7.2b). A 5-foot length of the dike crest near the center of the embankment has been backfilled with stone and earth, indicating overtopping erosion in this area.

c. Appurtenant Structures:

(1) Spillway: The appearance of the earth spillway is good. Only minor erosion was evident in the spillway channel (see Photograph 1).

(2) Outlet Works: The outlet end of the 10-inch diameter steel pipe appears to be in good condition. A sketch based on the following description is presented in Exhibit A-5. The outlet works was described by the owner as having a small concrete intake box connected to a 10-inch diameter outlet pipe by a short length of 6-inch diameter pipe that has a 6-inch gate valve. A 12-inch steel riser pipe is also connected to the 10-inch outlet. The top of the riser, described as being approximately 12 inches below the emergency spillway crest, was not visible on the day of the inspection. The outlet pipe discharge observed during the inspection was a fraction of the flow expected for the outlet works with a 1-foot head over the crest of the riser pipe (see Exhibit A-5). Consequently, the outlet works is considered to be partially blocked and the elevation of the emergency spillway crest is the normal pool elevation.

d. Reservoir Area: The watershed draining to the pond is farm land and woodland with 5 to 20 percent slopes. There is no evidence of unstable slopes which would affect the dam stability. The watershed features are presented in Exhibit E-1. Geologic conditions of the general area are described in Appendix F. The potential of increased development changing the hydrologic characteristics of the watershed is considered to be remote.

e. Downstream Channel: The channel immediately downstream of the dam is a flat natural marshy area. The first potential damage area is a road culvert, located 600 feet downstream of the dam. About 650 feet downstream are two residential structures located within 50 feet of the stream and 1.5 to 5.0 feet above it (see Photograph 5, Appendix C). Downstream of the dike, there is no road culvert to accommodate frequent overtopping of the dike without flooding the road.

A 15-foot high SCS flood control dam is located 4200 feet downstream of Bayly Pond. This dam is Quarno Dam, NDI ID No. PA-00089, and has been inspected and is classified as a High Hazard Structure. The dam is described in the 1981 inspection report prepared by Berger Associates (see also paragraph 5.3d).

Based on the location of the downstream dwellings and the fact that a few lives could be lost should the dam fail, the dam is classified as a significant hazard structure.

SECTION 4
OPERATIONAL PROCEDURES

4.1 Normal Operating Procedures.

The reservoir is maintained at normal pool by excess flow being discharged through the riser and over the earth spillway.

4.2 Maintenance of Dam.

Maintenance of the dam consists of mowing the grass slopes and repairing minor erosion channels.

4.3 Maintenance of Operating Facilities.

The outlet facilities are not systematically operated. At the time of inspection, their functional status could not be determined. The owner has periodically released water for livestock during dry periods.

4.4 Warning System.

There is no formal warning system in effect at the present time.

4.5 Evaluation.

The maintenance of the dam, dike and spillway is good. The frequency of inspections of the outlet works operating facilities should be increased.

SECTION 5
HYDROLOGY AND HYDRAULICS

5.1 Design Data.

There are no hydrologic or hydraulic data available for Bayly Pond Dam.

5.2 Experience Data.

There are no records available relative to maximum stages or discharges at the dam. The visual inspection suggests that the dike has been overtopped at least on one occasion (see Paragraph 3.1b).

5.3 Visual Observations.

Based on the visual inspection and field survey described in Section 3, the observations relevant to hydrology and hydraulics are evaluated as follows:

a. Embankments: The spillway elevation is 1395.4 and the low point on the dike is 1395.8, resulting in only 0.4 feet of free-board. The variation in dam and dike crest elevation is shown in Appendix D and is based on the field survey on the inspection date.

The downstream channel is wide and the total overtopping length at high discharges is 771 feet (for the dam and dike combined). Therefore, backwater would have no effect on the overtopping analysis.

b. Spillway: The spillway is a trapezoidal earth channel, 16 feet wide at the bottom, consisting of a short approach channel and followed by an earth outlet channel, having a bottom slope of 0.8% and terminating approximately 100 feet downstream of the left abutment of the dam. The spillway flow is spread over the natural ground surface having an 8% slope, prior to discharging into the stream channel. Normal depth flow conditions control the discharges at low stages in the channel. At higher stages, the flow over the spillway crest is at critical depth. A rating curve for the spillway is presented in Appendix D. The spillway is shown in Photographs 1 and 2, Appendix C.

c. Reservoir Area: There are no upstream hydraulic structures which would influence flood flow into Bayly Pond.

Future development to the extent that would alter hydrologic and hydraulic conditions is not anticipated.

d. Downstream Conditions: There are no downstream conditions which would affect Bayly Pond Dam hydraulically.

As mentioned in Section 3, the Quarno Dam, a high hazard structure, is located 4200 feet downstream of Bayly Pond Dam. According to its National Dam Inspection Phase I Report, the Quarno Dam has adequate spillway capacity and storage to be able to pass the full PMF without overtopping.

It is judged that a breach of Bayly Pond Dam would have no adverse effect on the stability of the Quarno Dam. Supporting computations are presented in Appendix D.

5.4 Method of Analysis.

Hydrologic and hydraulic evaluation was made in accordance with the procedures and guidelines established by the U.S. Army Corps of Engineers, Baltimore District, Phase I Safety Inspection of Dams. The analysis is presented in Appendix D.

5.5 Summary of Analysis.

a. Spillway Design Flood (SDF): According to criteria established by the office of the Chief of Engineers (OCE), the Spillway Design Flood (SDF) for the size (small) and hazard potential (significant) of the Bayly Pond Dam is between the 100-year flood and the one-half Probable Maximum Flood (1/2 PMF). The top of the dike is lower than the crest of the dam and the discharge over the dike bypasses the hazard area immediately downstream of the dam. Because of the small reservoir storage capacity and because failure of the dike may precede the failure of the dam, the 100-year flood is selected as the SDF for the Bayly Pond Dam.

b. Results of Analysis: Pertinent results are presented in Appendix D. The analysis reveals that under the prevailing top of dam and dike elevations, the combined discharge of service spillway and the emergency spillway is 13 CFS (cubic feet per second), when the water surface in Bayly Pond reaches the low point on the crest of the dike. The computed 100-year flood for the 0.12 square-mile drainage area above the dam is 130 cfs. Consequently, the present total capacity of the spillway is approximately 10 percent of the SDF. Should the crest of the dam and dike be brought to elevation 1397.2, or 1.4 feet above the low point on top of the dike, the spillway capacity will increase from the present 13 cfs to 130 cfs. Although outflow of water from Bayly Pond resulting from dike failure would bypass the hazard area downstream of the dam, frequent overtopping of the dike would overtop the road immediately downstream of the dike.

5.6 Spillway Adequacy.

Because the present capacity of the spillway will not pass the selected SDF without overtopping the dike and the dam, the spillway is rated as inadequate.

SECTION 6
EVALUATION OF STRUCTURAL STABILITY

6.1 Visual Observations.

The visual inspection of Bayly Pond Dam is described in Section 3. Observations relevant to the dam's structural stability are evaluated below:

a. Dam: Two 3-foot diameter saucer shaped depressions exist on the downstream slope of the dam (see paragraph 3.1b). The cause of these depressions cannot be evaluated from the available information. There is no evidence of piping to suggest internal erosion of the embankment.

b. Appurtenant Structures:

(1) Spillway: The spillway appears to be sound with no significant erosion in the outlet channel or on the steep bank at the termination of the excavated channel.

(2) Outlet Works: On the day of the inspection, the outlet pipe was not flowing full (see Photograph 3, Appendix C). Since the intake was submerged and the valve was inaccessible, pressure flow in the conduit could not be attained. Observations during pressure flow conditions are essential for the evaluation of structural stability.

6.2 Design and Construction Data.

There is no documented design or construction data.

6.3 Past Performance.

Except for the apparent overtopping of the dike, the dam has performed adequately since its construction in 1961.

6.4 Stability.

a. Static: The dam is considered to be stable under static loading conditions.

b. Seismic: The dam is located in seismic zone 1. If the dam has adequate structural stability under static conditions, it is assumed to be able to withstand the minor seismic forces expected in this zone.

SECTION 7
ASSESSMENT AND RECOMMENDATIONS FOR REMEDIAL MEASURES

7.1 Dam Assessment.

a. Safety:

(1) The Bayly Pond Dam is judged to be in good structural condition based on the visual inspection. Based on the location of the downstream dwellings and the fact that a few lives could be lost should the dam fail, the dam is classified as a significant hazard dam. Based on criteria established for these studies, the recommended Spillway Design Flood (SDF) varies between the 100-year flood and 1/2 of the Probable Maximum Flood (1/2 PMF). Because of the small reservoir storage capacity, the 100-year flood was selected for the SDF. Since the spillway cannot pass the 100-year flood without overtopping the dam, the spillway is rated as inadequate.

(2) A summary of the observed deficiencies is described below:

DESCRIPTION	OBSERVED DEFICIENCIES
Earth Embankments	
Dam	Erosion of the upstream face of the dam due to wave action.
Dike	The low point on the crest of the dike is 0.4 foot above the crest of the emergency spillway. Frequent overtopping of the dike is expected.
Appurtenant Structures	
Spillway	Inadequate capacity to discharge the SDF without overtopping the dike and the dam.
Outlet Works	The operational condition of the inlet valve requires verification. Means to draw down the reservoir must be provided in emergencies.

b. Adequacy of Information: There are no design or construction data available for Bayly Pond Dam. The visual inspection and computations performed as part of this study, as well as the past performance of the facility, are sufficient for the Phase I Dam Safety assessment, delineated in sub-paragraph a., aforementioned.

c. Urgency: The recommendations presented in Section 7.2 should be implemented immediately.

d. Necessity for Further Investigations: In order to accomplish some of the remedial measures outlined in paragraph 7.2, further investigation by a Professional Engineer experienced in the design and construction of dams will be necessary.

7.2 Recommendations and Remedial Measures.

a. The following investigations and remedial measures are recommended for immediate implementation by the owner.

(1) Increase the spillway capacity to pass at least the 100-year flood flow without overtopping the dam and the dike.

(2) Stabilize the upstream face of the dam against wave erosion.

(3) Verify the operational condition of the intake valve and provide other means to draw down the reservoir level in emergencies, should the valve be found inoperative.

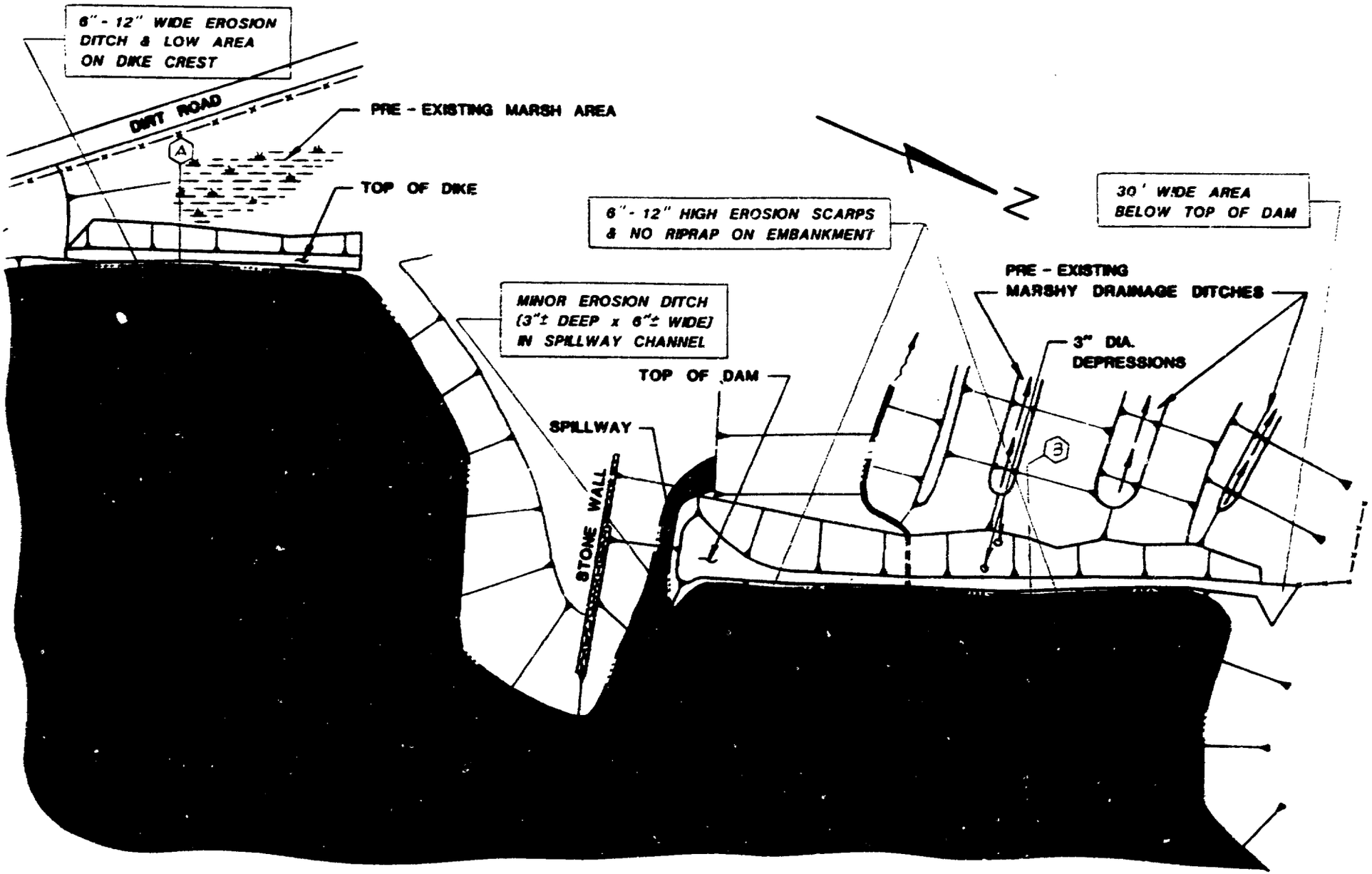
b. In addition, the owner should institute the following operational and maintenance procedures:

(1) Develop an emergency warning system which should include round-the-clock monitoring of the dam during periods of unusually heavy rains and a plan to contact the few downstream residents who would be affected by a dam failure.

(2) Institute an inspection program to include monitoring the existing depressions on the downstream slope of the dam and periodic operation of the outlet works to insure that a method of drawing down the pool is available and operable. As presently required by Bureau of Dams and Waterway Management of PENNDER, the program shall include an annual inspection of the dam by a Professional Engineer, experienced in the design and construction of dams. Deficiencies found during annual inspection should be remedied as necessary.

APPENDIX A

VISUAL INSPECTION - CHECKLIST AND FIELD SKETCHES



BAYLY POND DAM
GENERAL PLAN - FIELD INSPECTION NOTES

EXHIBIT A-1

GEO-TECHNICAL SERVICES
Consulting Engineers & Geologists

SHEET NO _____ OF _____
CALCULATED BY _____ DATE 4/81
CHECKED BY _____ DATE _____
SUBJECT DAM PROFILE

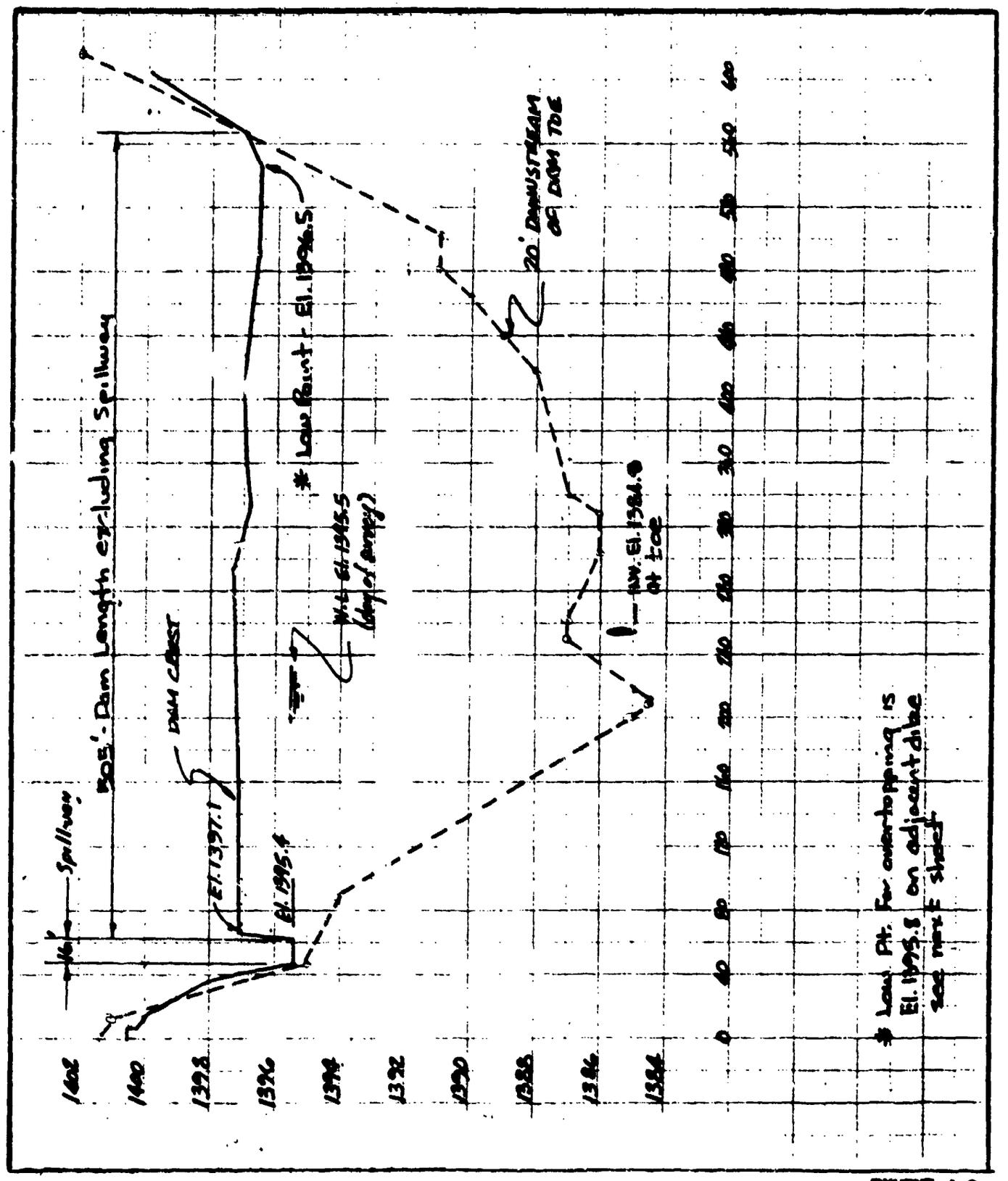


EXHIBIT A-2

GEO TECHNICAL SERVICES
Consulting Engineers & Geologists

JOB _____

SHEET NO 1 OF 1

CALCULATED BY RJM DATE 6-11-81

CHECKED BY _____ DATE _____

SCALE HORZ 1" = 50 VERT 1" = 1'

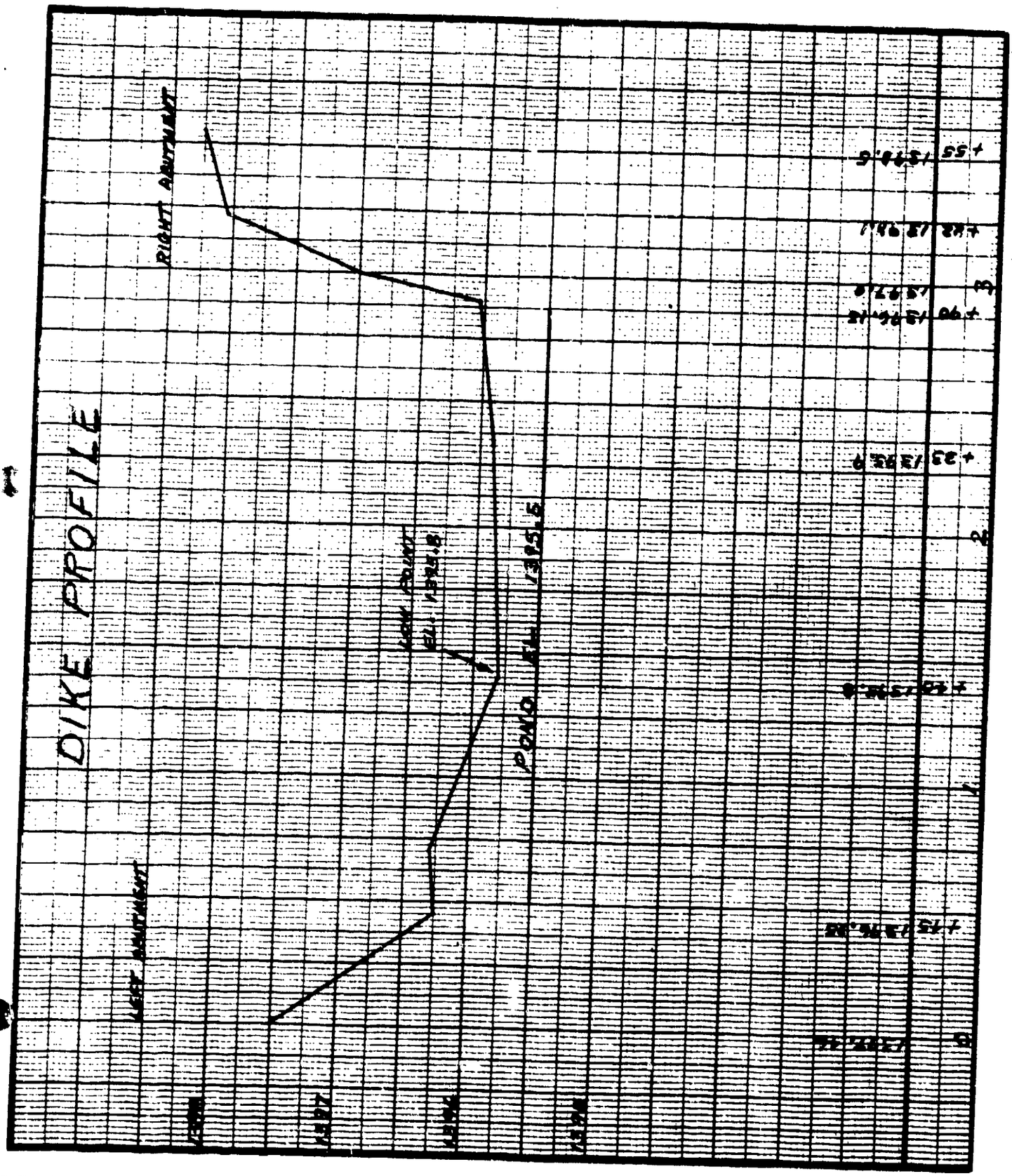
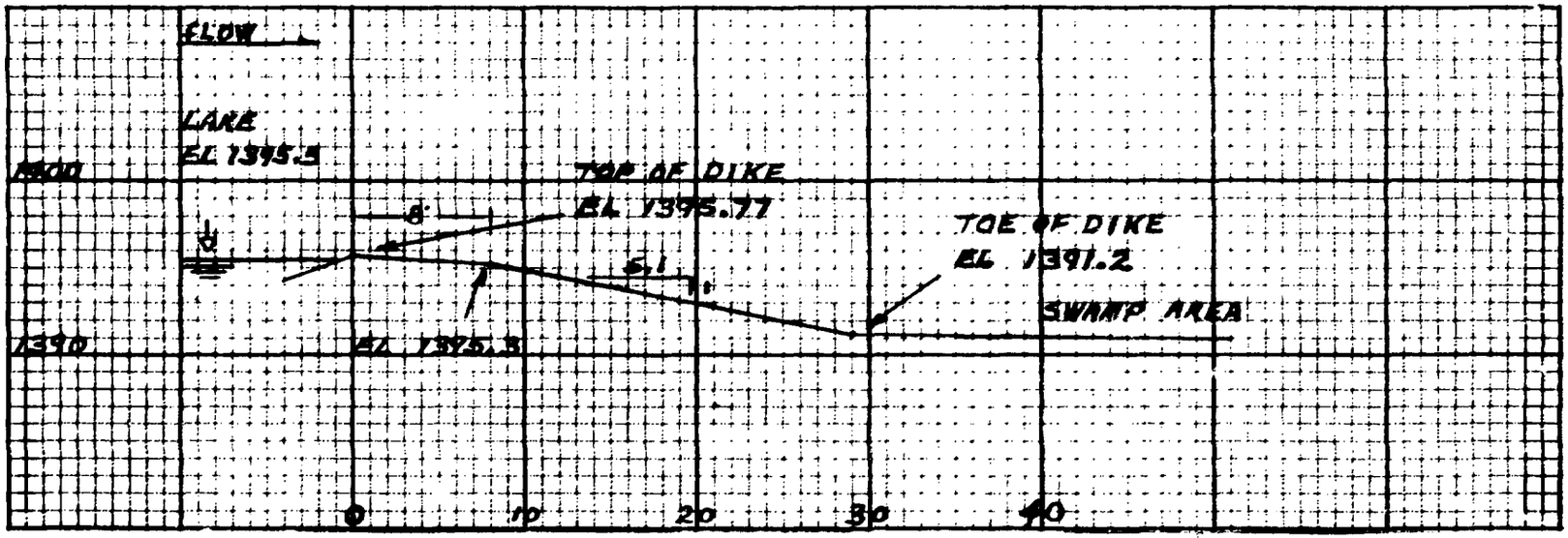
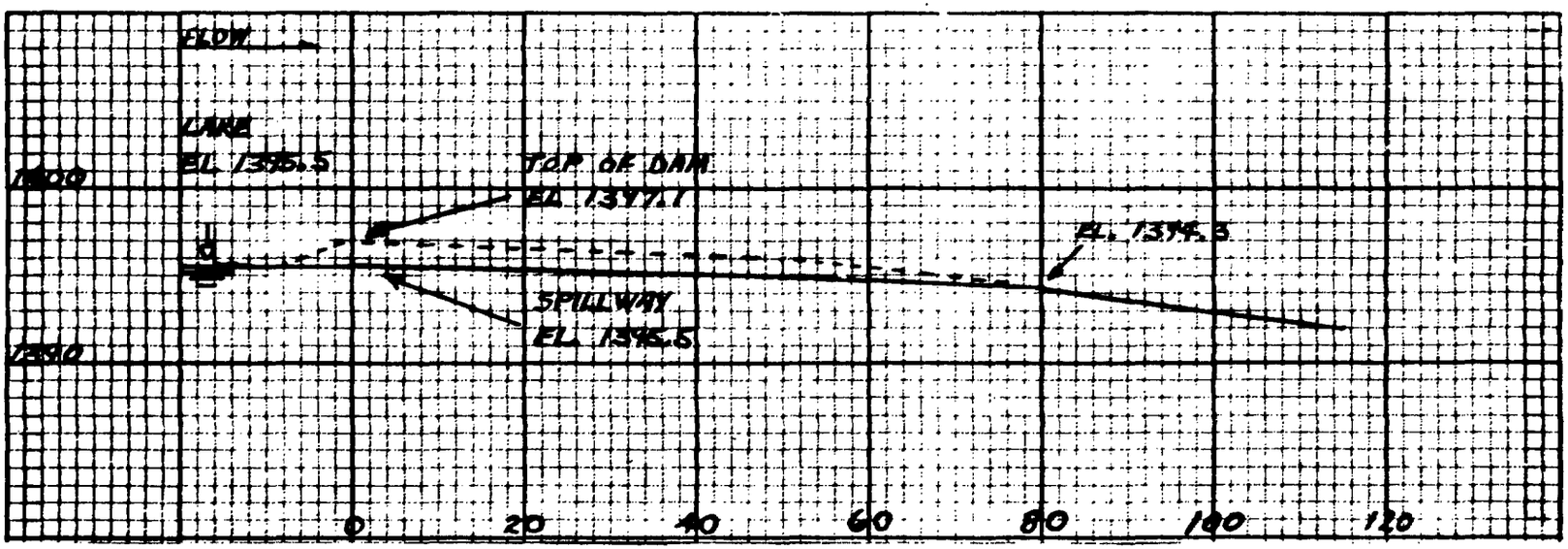


EXHIBIT A-6

TYPICAL DAM SECTIONS



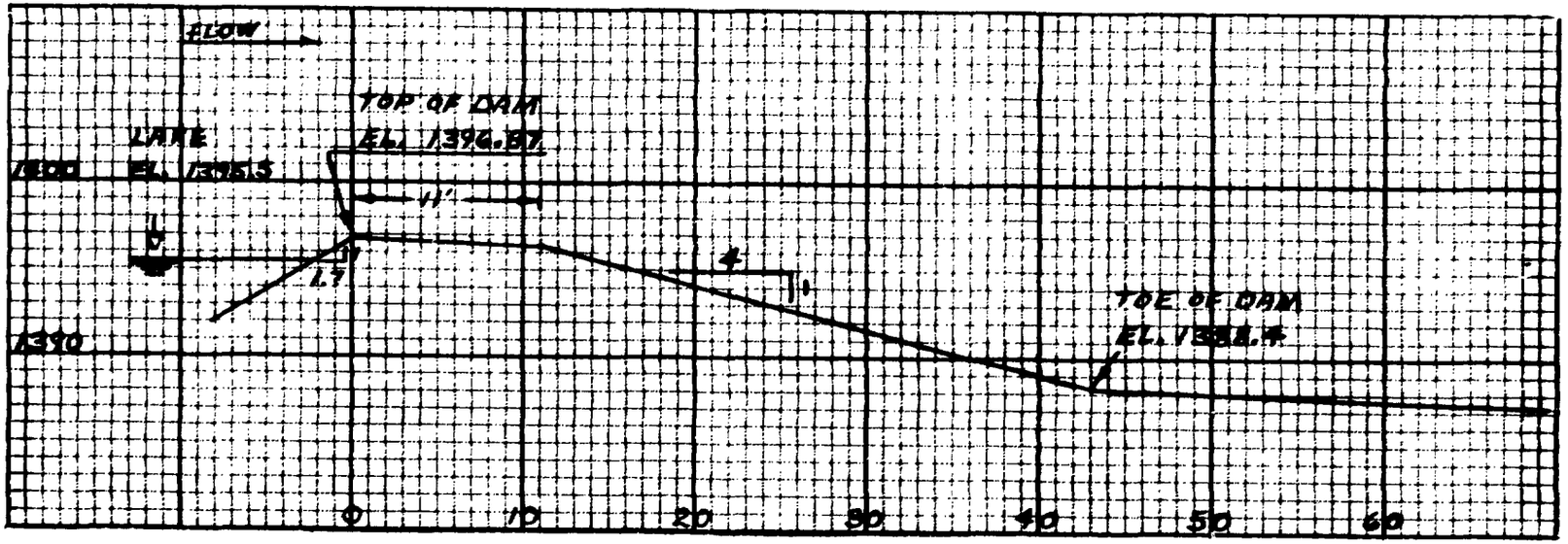
SECTION A



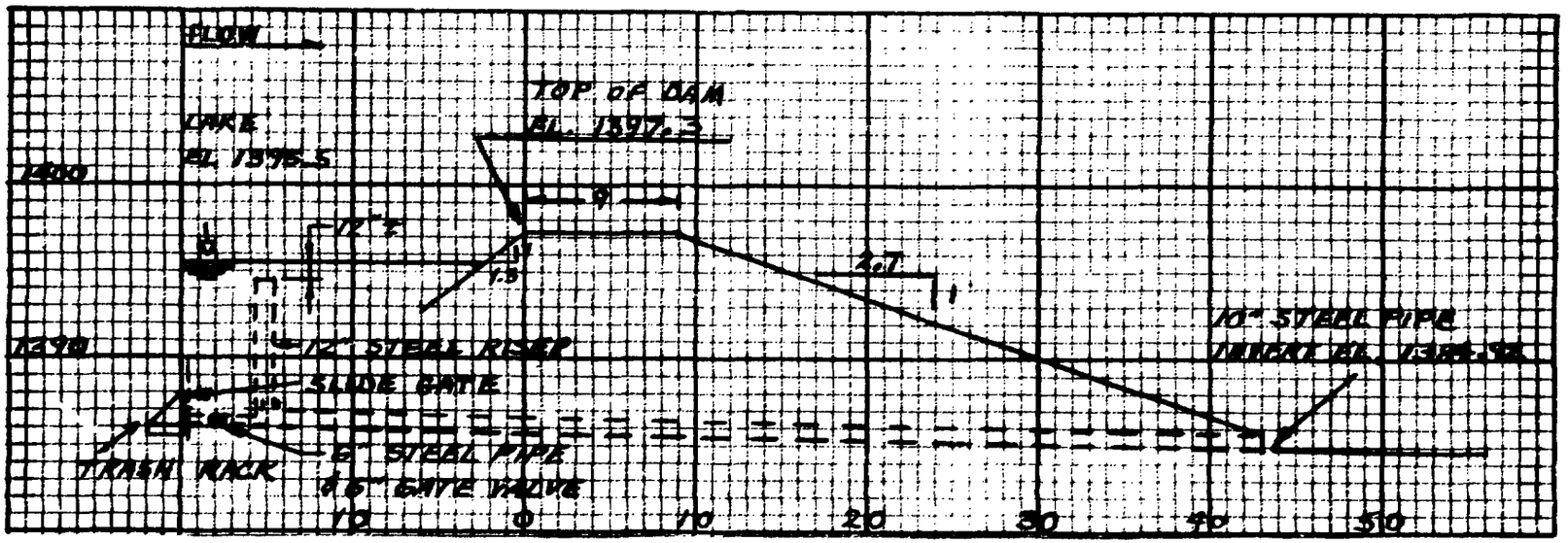
SPILLWAY SECTION

EXHIBIT A-4

TYPICAL DAM SECTIONS



SECTION B



OUTLET WORKS

EXHIBIT A-5

CHECK LIST
VISUAL INSPECTION
PHASE 1

NAME OF DAM Bayly Pond Dam STATE Pennsylvania COUNTY Wayne

NDI # PA — 0343 PENNDER # 64-0205

TYPE OF DAM Earthfill SIZE Small HAZARD CATEGORY Significant

DATE(S) INSPECTION March 3, 1981 WEATHER Partly Cloudy TEMPERATURE 20°F @ 9:00 a.m.

POOL ELEVATION AT TIME OF INSPECTION 1395.4 M.S.L.

TAIL WATER AT TIME OF INSPECTION 1384.8 M.S.L.

INSPECTION PERSONNEL	OWNER REPRESENTATIVES	OTHERS
G. Yachin, Engineer	G. W. Bayly	J. Chernesky, DER
J. Daiz, Geologist	E. Kannengiesser	
R. Mather, Surveyor		

RECORDED BY J. Diaz

PAGE 1 OF 8

EMBANKMENT

ITEM	OBSERVATIONS/REMARKS/RECOMMENDATIONS NDI# PA - 0343
SURFACE CRACKS	None
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	None
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	There are 6" to 12" high erosion scarps on the top 3' of the upstream slope due to wave action and cattle drinking water. There are two shallow depressions (3' dia. x 6"± deep) on the downstream slope right of the outlet pipe. A 6" to 12" wide erosion ditch and low area on the dike is the result of past overtopping. This area has been backfilled with earth and cobbles. (see Exhibit A-1)
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	Both Good.
RIPRAP FAILURES	No Riprap.
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	Good. No visible seeps. A 30-foot wide area on the right end of the dam is about 0.6' lower than the average dam crest. The abutment then rises on a 20% slope. The left abutment has an emergency earth spillway (see Exhibit A-2).

EMBANKMENT

ITEM	OBSERVATIONS/REMARKS/RECOMMENDATIONS NDI# PA - 0343
DAMP AREAS IRREGULAR VEGETATION (LUSH OR DEAD PLANTS)	Four shallow drainage ditches extend downstream from toe of the main dam in order to drain a pre-existing marshy area. The marshy area downstream of dike also existed prior to dike construction.
ANY NOTICEABLE SEEPAGE	None
STAFF GAGE AND RECORDER	None
DRAINS	None
ROCK OUTCROPS	None
CUT-OFF	A cut-off trench (3 to 5 feet deep X 8 feet wide) was excavated and backfilled with impervious material along the dam and dike centerlines (Description by owner).

OUTLET WORKS

ITEM	OBSERVATIONS/REMARKS/RECOMMENDATIONS — NDI# PA 0343
INTAKE STRUCTURE	A concrete intake box with trash rack and manual slide gate is connected to a 6" steel outlet pipe with a 6" gate valve. The 6" pipe discharges into a 10" diameter steel outlet pipe (description by owner).
OUTLET CONDUIT (CRACKING AND SPALLING OF CONCRETE SURFACES)	10" diameter steel pipe.
OUTLET STRUCTURE	None
OUTLET CHANNEL	The outlet channel is an earth channel that connects to one of the marsh drainage ditches (see Exhibit A-1).
GATE(S) AND OPERATIONAL EQUIPMENT	A manual slide gate on concrete intake box followed by a 6" gate valve. Both require under water operation (description by owner).

EMERGENCY SPILLWAY

ITEM	OBSERVATIONS/REMARKS/RECOMMENDATIONS NDI# PA - 0343
TYPE AND CONDITION	Earth channel (16' wide x 1.7± feet deep). There is a minor erosion ditch (3" deep, 6" wide) in the center of the spillway channel.
APPROACH CHANNEL	Short earth channel on left abutment.
SPILLWAY CHANNEL AND SIDEWALLS	Earth slopes.
STILLING BASIN PLUNGE POOL	None. Outlet channel discharges directly on left abutment slope.
DISCHARGE CHANNEL	The spillway discharge channel widens to 25 feet, curves toward the center of the valley and discharges onto the natural left abutment slope.
BRIDGE AND PIERS EMERGENCY GATES	None

SERVICE SPILLWAY

ITEM	OBSERVATIONS/REMARKS/RECOMMENDATIONS NDI# PA - 0343
TYPE AND CONDITION	A 12" diameter steel riser pipe at the upstream end of the 10" diameter outlet pipe (owners description). The top of the riser was submerged (owner reports top as about 1' below water surface).
APPROACH CHANNEL	N.A.
OUTLET STRUCTURE	None
DISCHARGE CHANNEL	An earth channel discharging into one of the marsh area drainage ditches.

INSTRUMENTATION

ITEM	OBSERVATIONS/REMARKS/RECOMMENDATIONS NDI# PA - 0343
MONUMENTATION SURVEYS	None
OBSERVATION WELLS	None
WEIRS	None
PIEZOMETERS	None
OTHERS	None

RESERVOIR AREA AND DOWNSTREAM CHANNEL

ITEM	OBSERVATIONS/REMARKS/RECOMMENDATIONS NDI# PA - 0343
SLOPES: RESERVOIR	The right abutment is a grass slope of 15 to 20 percent. The left abutment is a grass slope of 10 to 20 percent. The upstream wooded slopes are 20%+. There are no unstable slope conditions that would affect the stability of the dam.
SEDIMENTATION	None
DOWNSTREAM CHANNEL (OBSTRUCTIONS, DEBRIS, ETC.)	None. The downstream grass meadow area has 4 shallow drainage ditches parallel to the stream valley. About 550' downstream is a 6' diameter RCP road culvert. About 4200' downstream is a flood control dam (SCS).
SLOPES: CHANNEL VALLEY	Between the Township road and the downstream flood control dam, the channel valley is a wide, flat wooded natural marsh area.
APPROXIMATE NUMBER OF HOMES AND POPULATION	2 homes, 650 feet downstream of dam and 3 trailers downstream of the SCS flood control dam (Quarno Dam, located 4200' downstream of Bayly Pond Dam).

APPENDIX B

ENGINEERING DATA - CHECKLIST

CHECK LIST
ENGINEERING DATA
PHASE I

NAME OF DAM Bayly Pond Dam

ITEM	REMARKS	NDI# PA - 0343
PERSONS INTERVIEWED AND TITLE	G. W. Bayley, Owner	
REGIONAL VICINITY MAP	See Exhibit E-1, Appendix E.	
CONSTRUCTION HISTORY	Owner reports dam was constructed in 1961 by Maynard Freeman, R. D. #4, Honesdale, Pennsylvania. There are no records available.	
AVAILABLE DRAWINGS	There are no design or construction plans available. The owner described some of the facilities that are now under water or buried.	
TYPICAL DAM SECTIONS	See Exhibits A-1 thru A-5, Appendix A.	
OUTLETS PLAN DETAILS DISCHARGE RATINGS	 Not available. Not available.	

CHECK LIST
ENGINEERING DATA
PHASE I
(CONTINUED)

ITEM	REMARKS	NDI# PA - 0343
SPILLWAY PLAN SECTION DETAILS	None available. A general plan and typical sections (from survey on inspection date) are shown on Exhibits A-1 thru A-5, Appendix A.	
OPERATING EQUIP- MENT PLANS AND DETAILS	None available.	
DESIGN REPORTS	None available.	
GEOLOGY REPORTS	None available.	
DESIGN COMPUTATIONS: HYDROLOGY AND HYDRAULICS STABILITY ANALYSES SEEPAGE ANALYSES	None available.	
MATERIAL INVESTIGATIONS: BORING RECORDS LABORATORY TESTING FIELD TESTING	None available.	

CHECK LIST
ENGINEERING DATA
PHASE I
(CONTINUED)

ITEM	REMARKS	NDI# PA - 0343
BORROW SOURCES	No information available.	
POST CONSTRUCTION DAM SURVEYS	None available other than the survey made for the present inspection on March 3, 1981.	
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	None available.	
HIGH POOL RECORDS	None available.	
MONITORING SYSTEMS	None	
MODIFICATIONS	No information available.	

CHECK LIST
ENGINEERING DATA
PHASE I
(CONTINUED)

ITEM	REMARKS	NDI# PA - 0343
PRIOR ACCIDENTS OR FAILURES	None reported.	
MAINTENANCE RECORDS MANUAL	None available.	
OPERATION RECORDS MANUAL	None available.	
OPERATIONAL PROCEDURES	Self-regulating.	
WARNING SYSTEM AND/OR COMMUNICATION FACILITIES	None.	
MISCELLANEOUS		

CHECK LIST
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

NDI ID # PA-0343
PENNDER ID # 64-205

SIZE OF DRAINAGE AREA: 0.12 square mile

ELEVATION TOP NORMAL POOL 1395.4 STORAGE CAPACITY 45-acre feet

ELEVATION TOP FLOOD CONTROL POOL 1395.8 STORAGE CAPACITY 51 acre-feet

ELEVATION MAXIMUM DESIGN POOL No data STORAGE CAPACITY No data

ELEVATION TOP DIKE: 1395.8 STORAGE CAPACITY: 51 acre-feet

SPILLWAY DATA (Emergency Spillway)

CREST ELEVATION: 1395.4 (feet above m.s.l.)

TYPE: Trapizoidal excavated earth

CREST LENGTH: 16 feet

CHANNEL LENGTH: 100+ feet

SPILLOVER LOCATION: Left abutment

NUMBER AND TYPE OF GATES: None

OUTLET WORKS

TYPE: Concrete box with manual slide gate, 6" gate valve and 10" steel outlet pipe.

LOCATION: Center of dam

ENTRANCE INVERTS: Unknown (under water)

EXIT INVERTS: 1384.8 (feet above m.s.l.)

EMERGENCY DRAWDOWN FACILITIES: Manual slide gate and 6" gate valve.

HYDROMETEOROLOGICAL GAGES

TYPE: None

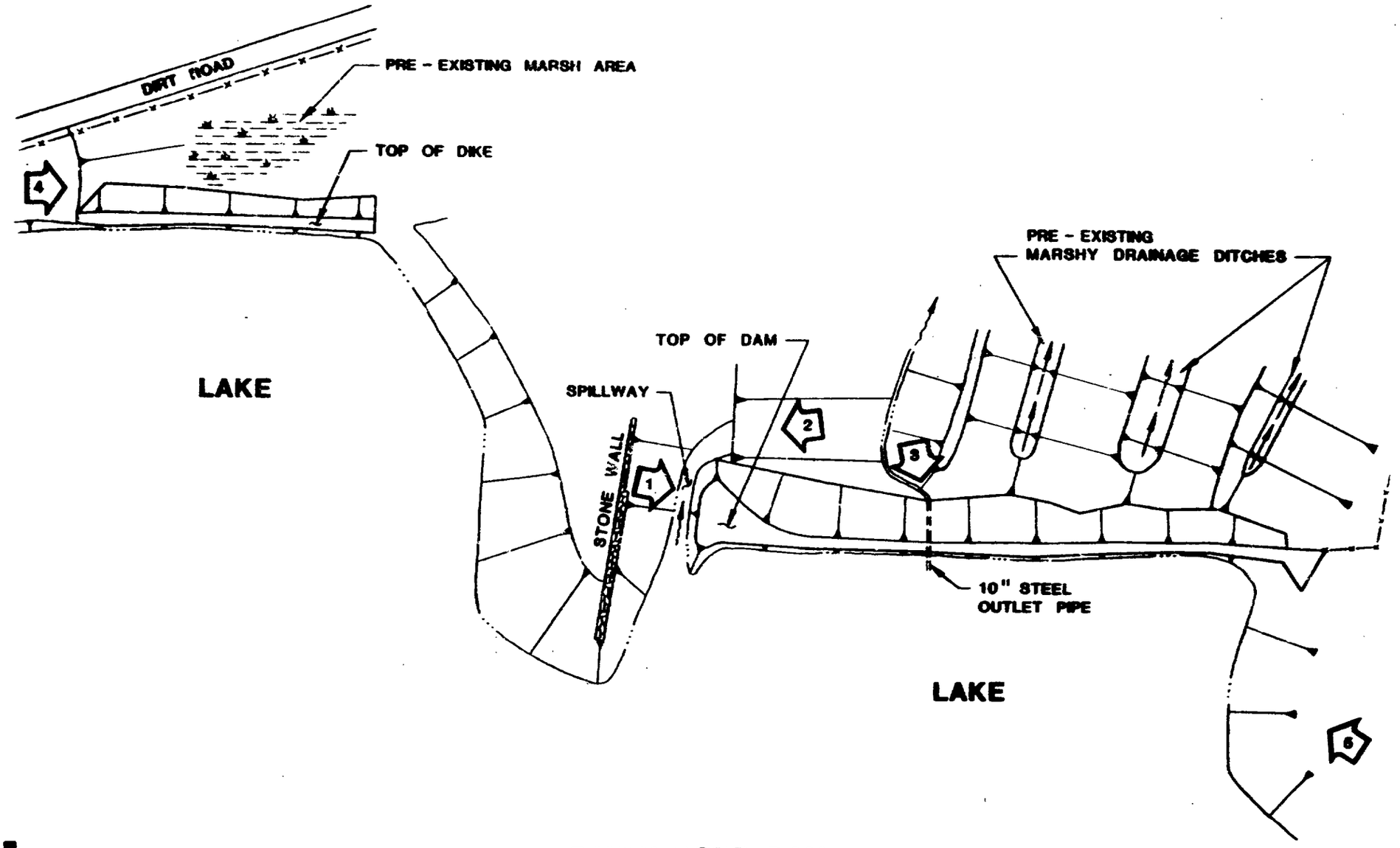
LOCATION: N.A.

RECORDS: N.A.

MAXIMUM NON-DAMAGING DISCHARGE: 13 cfs

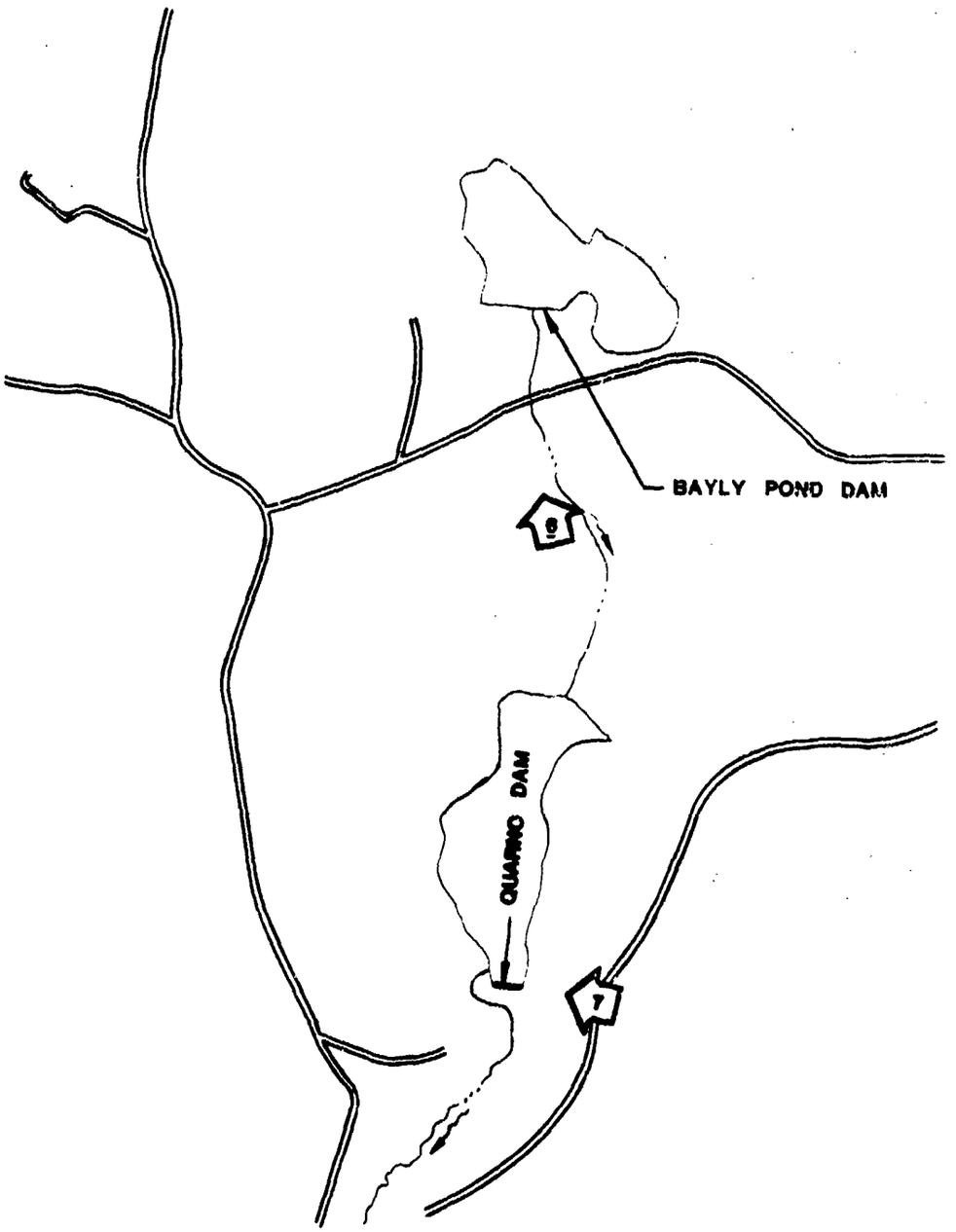
APPENDIX C

PHOTOGRAPHS



BAYLY POND DAM
PHOTOGRAPHS LOCATION MAP

EXHIBIT 0-1



BAYLY POND DAM
DOWNSTREAM PHOTOGRAPHS LOCATION MAP

EXHIBIT C-2

1. VIEW OF DAM FACING RIGHT ABUTMENT, SPILLWAY IN FOREGROUND

2. UPSTREAM VIEW OF SPILLWAY. EXCAVATED CHANNEL ENDS AT ARROW

3. 10" DIA. OUTLET WORKS

4. VIEW OF DIKE FACING RIGHT ABUTMENT
BROWN AREA ON LEFT IS MARSH AREA

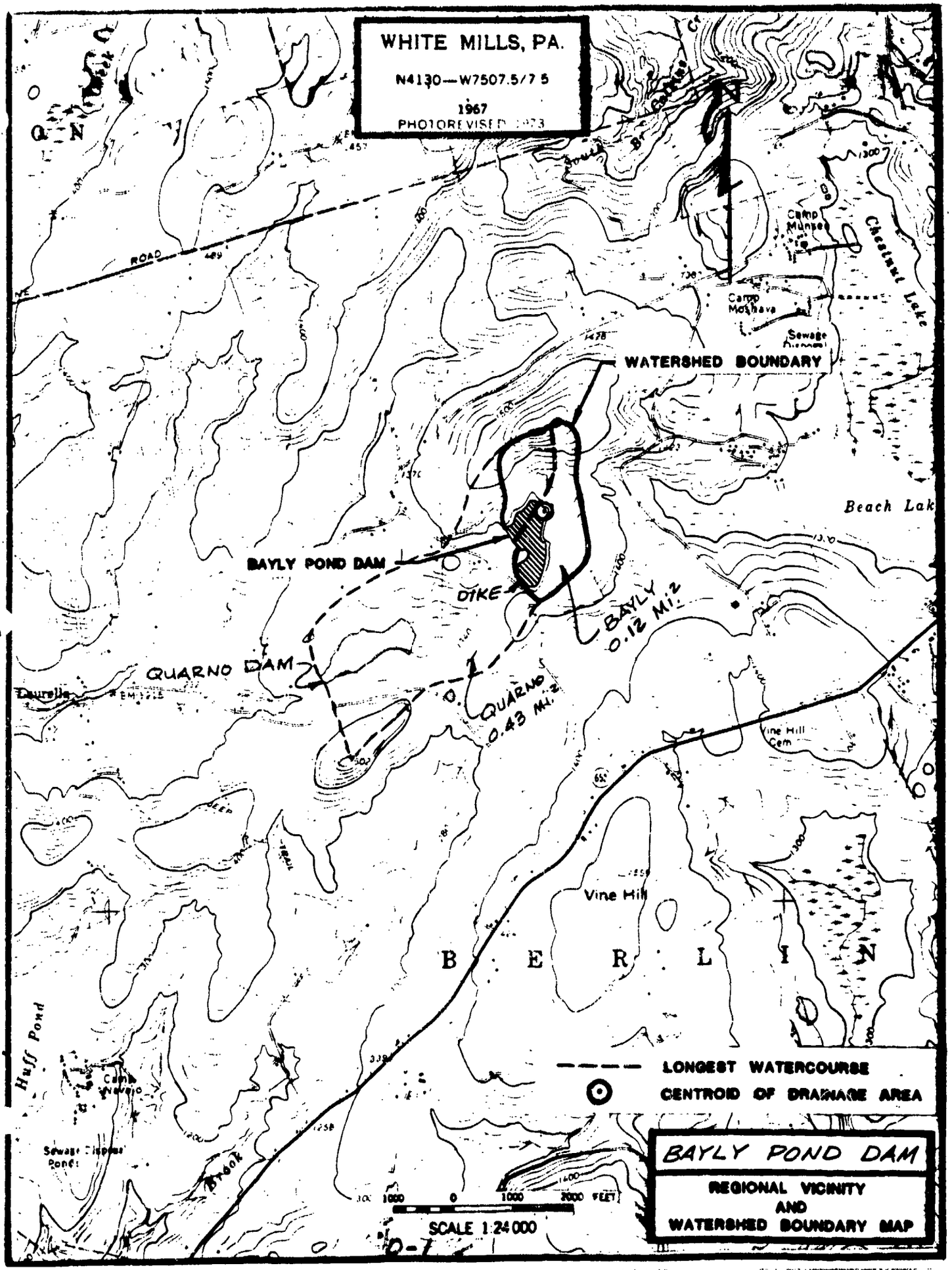
5. VIEW SHOWING DAM , MARSH AREA DRAINAGE DITCHES AND HOMES DOWNSTREAM

6. UPSTREAM VIEW OF ROAD CULVERT BELOW DAM

7. VIEW OF DOWNSTREAM FLOOD CONTROL DAM (QUARNO DAM) FACING RIGHT ABUTMENT

APPENDIX D

HYDROLOGY AND HYDRAULICS


WHITE MILLS, PA.
N4130—W7507.5/7.5
1967
PHOTOREVISED 1973
WATERSHED BOUNDARY
BAYLY POND DAM
DIKE
BAYLY 0.12 MI.²
QUARNO DAM
QUARNO 0.43 MI.²
Beach Lak
Chestnut Lake
Camp Mohave
Sewage Plant
Vine Hill
Vine Hill Cem
Daurella
Huff Pond
Sewage Disposal Pond
B E R L I N
LONGEST WATERCOURSE
CENTROID OF DRAINAGE AREA
SCALE 1:24000
BAYLY POND DAM
REGIONAL VICINITY AND WATERSHED BOUNDARY MAP

GEO-TECHNICAL SERVICES
Consulting Engineers & Geologists

CALCULATED BY SPM 4/81
CHECKED BY DATE

H&H ANALYSIS

GENERAL DATA

RIVER BASIN	DELAWARE
STREAM NAME	BRANCH OF HOLBERT CR'K
NDI - ID NO.	PA - 0129
DER - ID NO.	64 - 205
OWNER	GEO. W. BAYLY
LOCATION	BERLIN TWP.
COUNTY	WAYNE
LAT.	41° 36.0'
LONG.	75° 11.0'
SIZE	SMALL
HAZARD	
UPSTR. DAMS	NONE
DWNSTR. DAMS	QUARNO DAM PA-0089

RAINFALL DATA : (REF: HYDROMETEOROLOGICAL REPORT NO. 33)

DELAWARE RIVER BASIN - ZONE 1

PMP = 21.3" / 24 HR

ADJUSTMENTS FOR DRAINAGE AREA < 10 mi²

DURATION (HRS)	ADJUSTMENT (%)
6	111
12	123
24	133
48	142

HYDROGRAPH DATA

DRAINAGE AREA = 0.12 mi² ZONE 1

SNYDER UNIT HYDROGRAPH COEFF. (as per CORPS)

$C_p = 0.45$

$C_T = 1.23$

LAG TIME (centroid within pond area)

$T_p = C_t L'^{0.6}$ (as per COE)

L' = FROM RESERVOIR INLET TO DRAINAGE DIVIDE

$L' = 1100'$

$$T_p = 1.23 \left(\frac{1100}{5280}\right)^{0.6} = 0.48 \text{ HR.}$$

DAM DATA {DAM HAS AN ADJACENT DIKE}

TOP DAM (LOW PT.)	=	1396.5 (ON DAM) 1395.8 (ON DIKE)
DAM LENGTH (incl. spillway)	=	521'
DAM HEIGHT (max.)	=	11.7'
DAM TOP WIDTH	=	10'
WEIR COEFF. - DAM OVERFLOW.	=	3.0
WEIR EQUATION EXPONENT	=	1.5

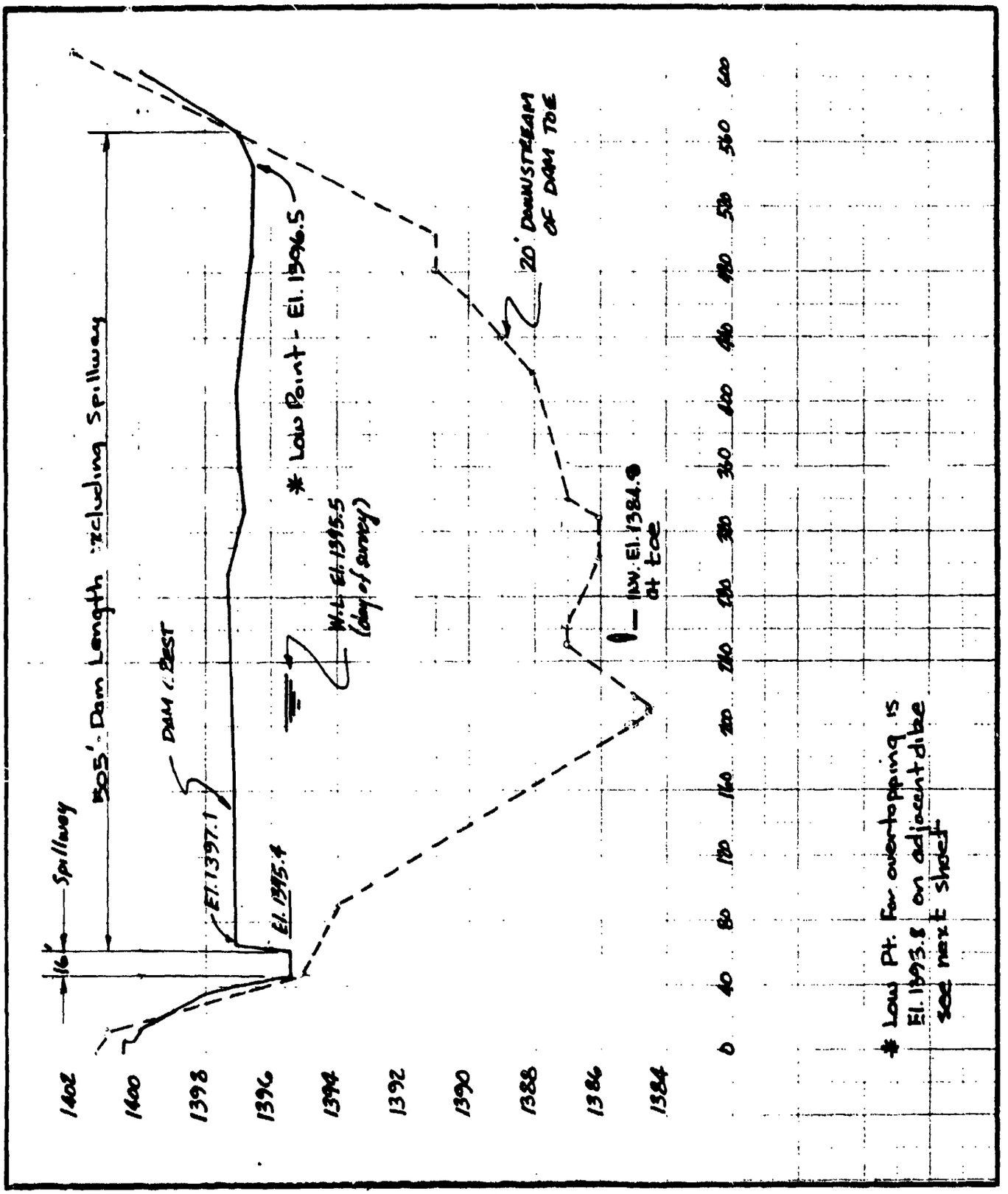
NOTE: LEVEL DAM CREST - COMPUTER INPUT - INCLUDES LENGTH ALLOWANCE FOR DIKE (SEE pg D-6 & pg D-7)

DAM/DIKE LENGTH	ELEVATION
0	1395.8
176	1396.0
256	1396.5
322	1396.6
548	1397.1
846	1398.0

GEO-TECHNICAL SERVICES
Consulting Engineers & Geologists

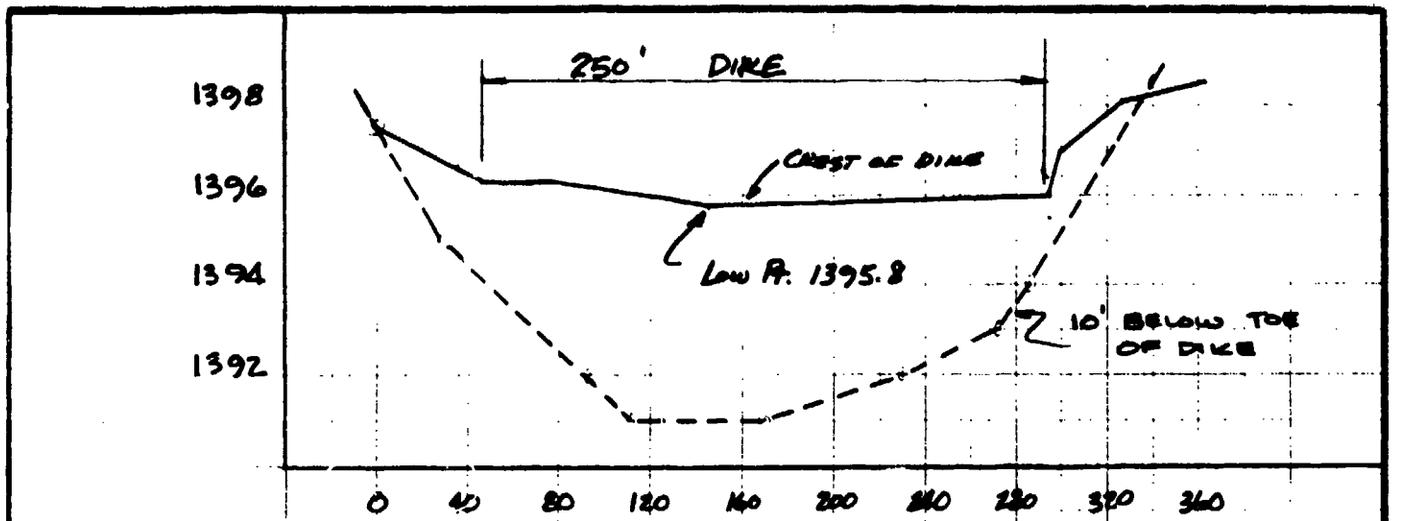
SHEET NO. _____ OF _____
CALCULATED BY _____ DATE 4/81
CHECKED BY _____ DATE _____

DAM PROFILE



GEO-TECHNICAL SERVICES
Consulting Engineers & Geologists

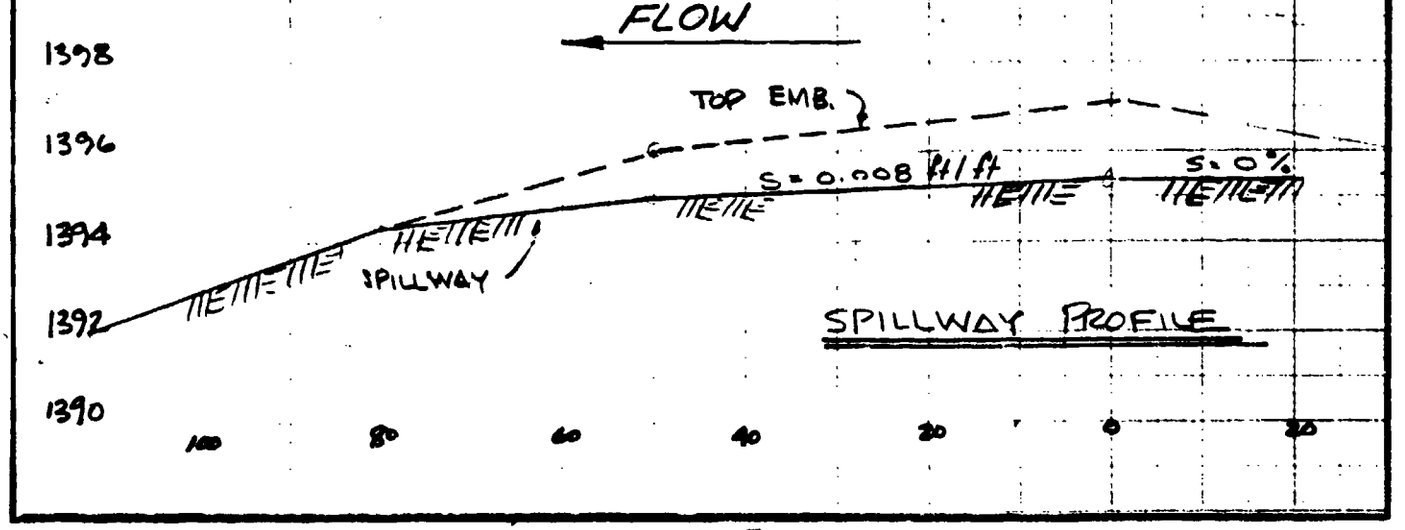
SHEET NO. _____ OF _____
CALCULATED BY sjm DATE 4/81
CHECKED BY _____ DATE _____
H&H



DIKE PROFILE

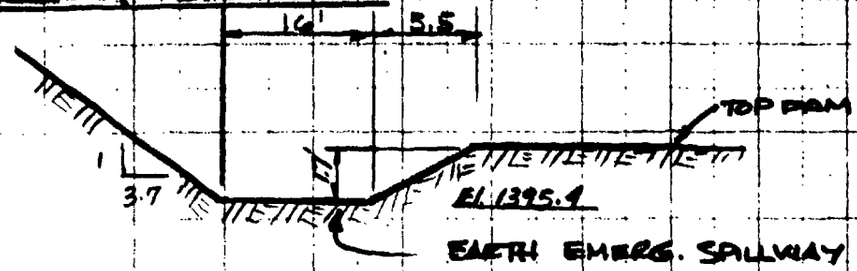
NON LEVEL CREST DATA

ELEVATION	LENGTH DIKE	LENGTH DAM	TOTAL DAM & DIKE
1395.8	0	0	0
1396.0	176	0	176
1396.5	256	0	256
1396.6	262	60	322
1397.1	290	258	548
1398.0	332	514	846



SPILLWAY PROFILE

EMERGENCY SPILLWAY



SPILLWAY RATING:

OUTLET SLOPE IS 0.8% ∴ CHECK NORMAL DEPTH FLOW IN OUTLET CHANNEL AGAINST CRITICAL DEPTH NEAR ENTRANCE TO SEE WHICH CONTROLS DISCHARGE

(n = normal depth c = critical)

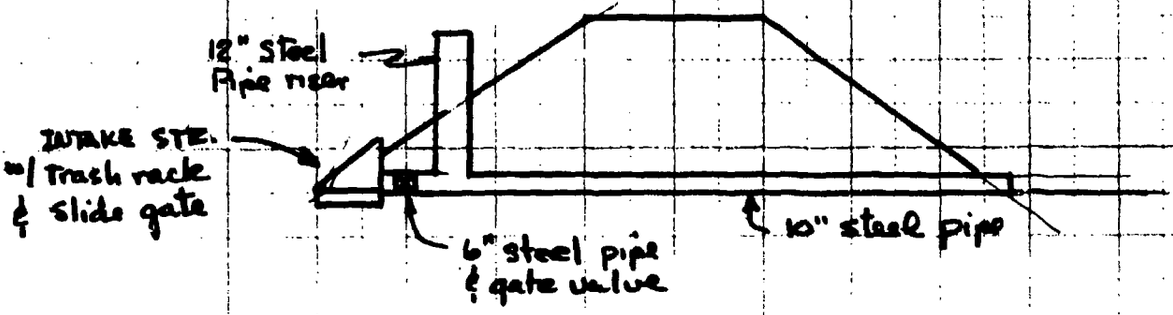
$$Q_n = \frac{1.486}{.028} A R^{2/3} \sqrt{S} \qquad Q_c = \sqrt{\frac{A^3 g}{T}}$$

POOL ELEV. = $y + \Delta h$

$$\Delta h = (1 + C_i)\frac{V^2}{2g} \qquad *C_i = 0.3$$

*(OPEN-CHANNEL HYDRAULICS By VEN TE CHOW on PAGE 31)

OUTLET WORKS (as described by owner)



OUTLET RATING

6" INTAKE DISCHARGED 70 ± GPM ON DAY OF INSPECTION

MAIN OUTLET FLOW THRU 12" RISER & 10" PIPE. 4 CONDITIONS MAY CONTROL FLOW - DEPENDING ON STAGE:

COMPUTE ALL & USE LOWEST FOR RATING CURVE

1. WEIR FLOW OVER RISER LIP - $Q_1 = 3\pi H^{1.5}$
2. ORIFICE CONTROL - 12" RISER - $Q_2 = .6\, a \sqrt{2gH_2}$
3. ORIFICE CONTROL - 10" OUTLET - $Q_3 = .6\, a \sqrt{2gH_3}$
4. PRESSURE FLOW IN 10" OUTLET - $Q_4 = .a \sqrt{\frac{2gH}{K(n,L)}}$

BAYLY POND SPILLWAY RATING

Y	Qn	Vn	En	Qe	Ve	Ec
0.10	2	1.8	1395.6	1	1.0	1395.5
0.20	8	2.5	1395.7	5	1.6	1395.7
0.30	15	3.0	1395.9	10	2.0	1395.8
0.40	24	3.5	1396.0	17	2.4	1395.9
0.50	33	3.8	1396.2	24	2.8	1396.1
0.60	45	4.2	1396.3	33	3.1	1396.2
0.70	57	4.5	1396.5	44	3.4	1396.3
0.80	71	4.7	1396.7	55	3.7	1396.5
0.90	85	5.0	1396.8	68	4.0	1396.6
1.00	101	5.2	1397.0	82	4.2	1396.8
1.10	118	5.5	1397.1	97	4.5	1396.9
1.20	136	5.7	1397.2	113	4.7	1397.0
1.30	156	5.9	1397.4	130	4.9	1397.2
1.40	176	6.0	1397.5	149	5.1	1397.3
1.50	197	6.2	1397.7	169	5.3	1397.5
1.60	220	6.4	1397.8	190	5.5	1397.6
1.70	244	6.6	1398.0	212	5.7	1397.8
1.80	270	6.8	1398.0	237	5.9	1397.8
1.90	297	7.0	1398.1	263	6.2	1397.9
2.00	326	7.1	1398.1	291	6.4	1397.9
2.10	355	7.3	1398.2	319	6.6	1398.0
2.20	385	7.5	1398.2	349	6.8	1398.0
2.30	416	7.7	1398.3	380	7.0	1398.1
2.40	449	7.8	1398.3	413	7.2	1398.1
2.50	482	8.0	1398.4	446	7.4	1398.2
2.60	516	8.1	1398.4	481	7.6	1398.3
2.70	552	8.3	1398.5	517	7.7	1398.3
2.80	588	8.4	1398.5	554	7.9	1398.4
2.90	625	8.6	1398.6	592	8.1	1398.4
3.00	663	8.7	1398.6	631	8.3	1398.5
3.25	763	9.0	1398.7	735	8.7	1398.6
3.45	847	9.3	1398.8	823	9.0	1398.7
3.65	935	9.5	1398.9	917	9.3	1398.9
3.20	742	9.0	1398.7	714	8.6	1398.6
3.40	825	9.2	1398.8	801	8.9	1398.7
3.60	912	9.5	1398.9	893	9.3	1398.8
3.80	1003	9.7	1399.0	990	9.6	1398.9
4.00	1098	9.9	1399.1	1091	9.9	1399.1
4.20	1197	10.1	1399.2	1198	10.1	1399.2
4.40	1299	10.4	1399.3	1309	10.4	1399.3
4.60	1405	10.6	1399.4	1425	10.7	1399.4
4.80	1516	10.8	1399.4	1547	11.0	1399.5
5.00	1630	11.0	1399.5	1673	11.2	1399.7

```
5DEFFN1(Z)=INT(Z/.1+.5)*.1
10 FOR I=3.2TO 6STEP .2
20 Y=I:IF Y[1.8THEN 30:Y=1.7
30 A=(16+3.45*Y)*Y:P=16+7.19*Y:T=16+6.9*Y
40IF I[1.8THEN 200
50 Y1=I-1.7:A=A+Y1*(2*T+Y1*3.7)/2
60 P=P+3.83*Y1:T=T+3.7*Y1
200R=A/P
210 Q0=SQR(A*A*A*32.2/T):V0=Q0/A:E0=1395.4+Y+1.3*V0*V0/64.4
220 V1=4.75*R!(2/3):Q1=A*V1:E1=1395.4+Y+1.3*V1*V1/64.4
300PRINTUSING 500,I,FN1(Q0),FN1(V0),FN1(E0),FN1(Q1),FN1(V1),FN1(E1)
310 NEXT I
500% #.##   ####  ##.#  ####.#   ####  ##.#  ####.#
```

BAYLY POND OUTLET RATING

	Q_1	Q_2	Q_3	Q_4
1396.2	0.2	1.1	7.8	7.0
1396.3	0.8	1.6	7.9	7.1
1396.4	1.5	2.0	7.9	7.1
1396.5	2.3	2.3	8.0	7.2
1396.6	3.3	2.6	8.0	7.2
1396.7	4.3	2.9	8.0	7.3
1396.8	5.5	3.1	8.1	7.3
1396.9	6.7	3.3	8.1	7.4
1397.0	8.0	3.5	8.2	7.5
1397.1	9.4	3.7	8.2	7.5
1397.2	10.8	3.9	8.3	7.6
1397.3	12.3	4.1	8.3	7.6
1397.4	13.9	4.2	8.3	7.7
1397.5	15.6	4.4	8.4	7.7
1397.6	17.3	4.6	8.4	7.8
1397.7	19.0	4.7	8.5	7.8
1397.8	20.8	4.9	8.5	7.9
1397.9	22.7	5.0	8.5	7.9
1398.0	24.6	5.1	8.6	8.0
1398.1	26.6	5.3	8.6	8.0
1398.2	28.6	5.4	8.7	8.1
1398.3	30.7	5.5	8.7	8.1
1398.4	32.9	5.7	8.7	8.2
1398.5	35.0	5.8	8.8	8.2
1398.6	37.2	5.9	8.8	8.3
1398.7	39.5	6.0	8.8	8.3
1398.8	41.8	6.1	8.9	8.4
1398.9	44.1	6.3	8.9	8.4
1399.0	46.5	6.4	9.0	8.5
1399.1	48.9	6.5	9.0	8.5
1399.2	51.4	6.6	9.0	8.6
1399.3	53.9	6.7	9.1	8.6
1399.4	56.4	6.8	9.1	8.6
1399.5	59.0	6.9	9.1	8.7
1399.6	61.7	7.0	9.2	8.7
1399.7	64.3	7.1	9.2	8.8

```
10 FOR E=1396.2TO 1399.7STEP .1
20 H1,H2=E-1396.1
30 H3=E-1387:H4=E-1390
40 Q1=3*#PI*H1^1.5:Q2=3.77*SQR(H2):Q3=2.6*SQR(H3):Q4=2.836*SQR(H4)
50 PRINTUSING 100,E,Q1,Q2,Q3,Q4
60 NEXT E
100% ####.#  ###.#  ###.#  ###.#  ###.#
```

GEO-TECHNICAL SERVICES
Consulting Engineers & Geologists

CALCULATED BY SJM DATE 4/81

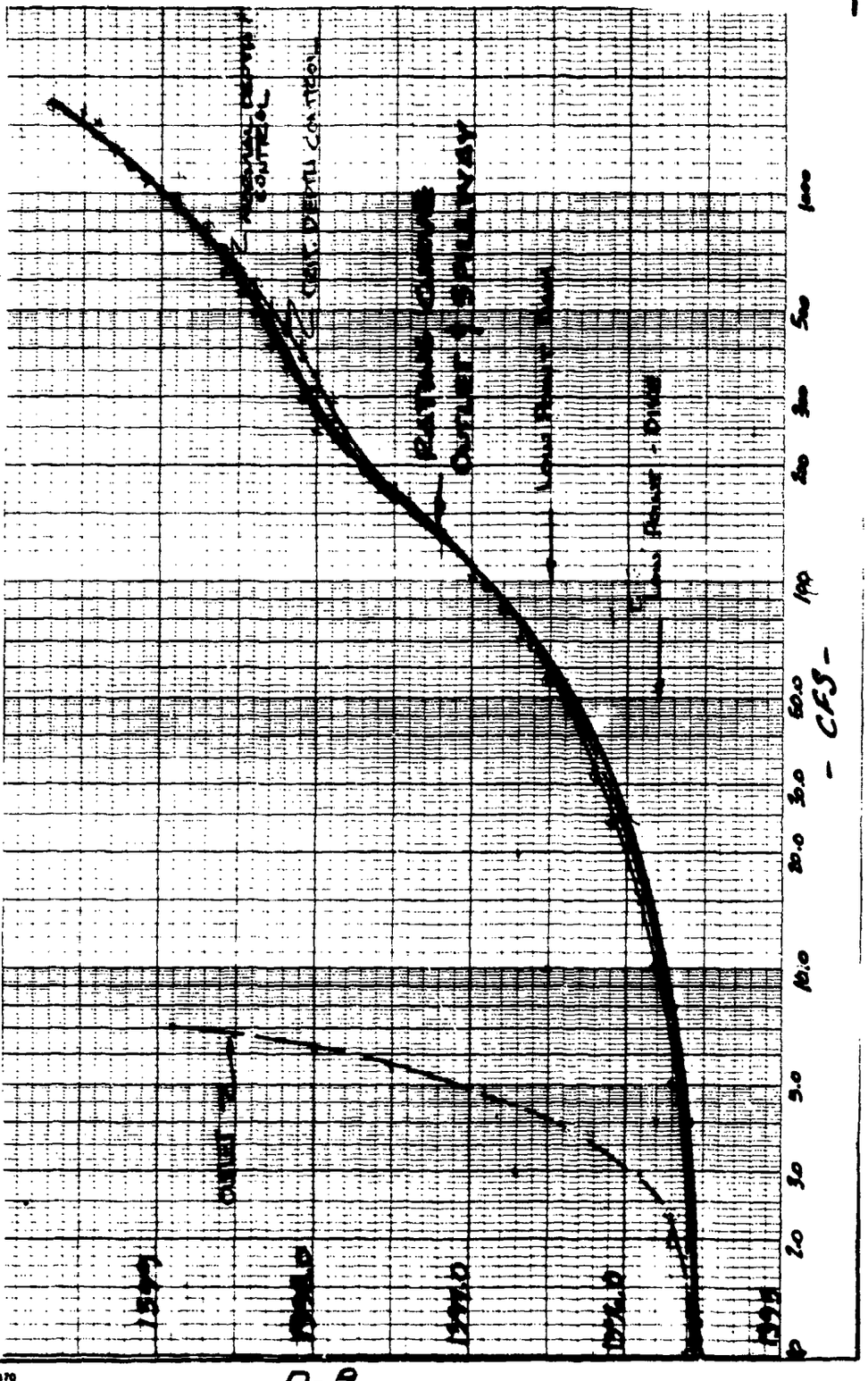
CHECKED BY DATE

SPILLWAY RATING CURVE

HEC-1DB

RATING CURVE INPUT

Elev.	Flow
1395.4	0
1395.5	1
1395.7	8
1396.0	24
1396.5	52
1397.0	106
1397.5	165
1398.0	285
1398.5	500
1399.0	1000
1399.5	1500



(OUTLET RATING CONT.)
T.W. ESTIMATED @ 3'
OUTLET INV. = EL. 1384.8
TOP OF 12" ENDS 1395.4 (ESTIMATED)

GEO-TECHNICAL SERVICES
Consulting Engineers & Geologists

SHEET NO.
CALCULATED BY sfm DATE 5/81
CHECKED BY DATE
SCALE

RESERVOIR STORAGE

	PLAN.	ACRES
SURFACE AREA (ASSUME EL. 1395.4)	0014	13
EL. 1400 (CONTOUR)	0018	16.5

STORAGE UNKNOWN
ASSUME STORAGE = 0 @ EL. 1385

STORAGE AT $1395.4 = \frac{10.4}{3}(13) = 45$ Ac-ft.

STORAGE AT $1400.0 = 45 + \frac{4.6}{3}(16.5 + 13 + \sqrt{13(16.5)})$

$= 113$ Ac-ft

INTERPOLATED STORAGE AT MAX. POOL
@ EL. 1395.8
STORAGE = 51 Ac-ft

ELEV.	AREA (Ac)	
1385.0	0	(NATURAL STREAM BED)
1395.4	13	(NORMAL W.S. ELEV.)
1400.0	16.5	(CONTOUR)

GEO-TECHNICAL SERVICES
Consulting Engineers & Geologists

JOB BAYLY POND
SHEET NO ... OF ...
CALCULATED BY ... DATE 5/81
CHECKED BY ... DATE ...
SCALE ...

DETERMINE 100 YR FLOOD

REF. 1) "REGIONAL FREQUENCY STUDY, UPPER DELAWARE AND HUDSON RIVER BASINS" NEW YORK DIST. C.O.E. 1974

2) C.O.E. MEMO 4/22/81

$\text{Log } Q_m = C_m + 0.87 \text{ Log } A$

$A = 0.12 \text{ mi}^2$

$C_m = 1.8$

$\text{Log } Q_m = 1.8 + 0.87 \text{ Log}(.12) = 1.0$

$S = C_s - 0.05 \text{ Log}(A)$

$C_s = 0.37$

$S = 0.37 - 0.05 \text{ Log}(.12) = 0.416$

$\text{Log } Q_p = \text{Log } Q_m + K_{p,g} S$

$p = 100 \text{ yr.}$

$g = .5$

$K_{pg} = 2.70$

$\text{Log } Q_{100} = 1 + 2.7(.416) = 2.12$

$Q_{100} = 132.8$ say 130 cfs

SPILLWAY CAPACITY AT El. 1395.8 = 13 cfs

100 yr. flood will overtop the dike

GEO-TECHNICAL SERVICES
Consulting Engineers & Geologists

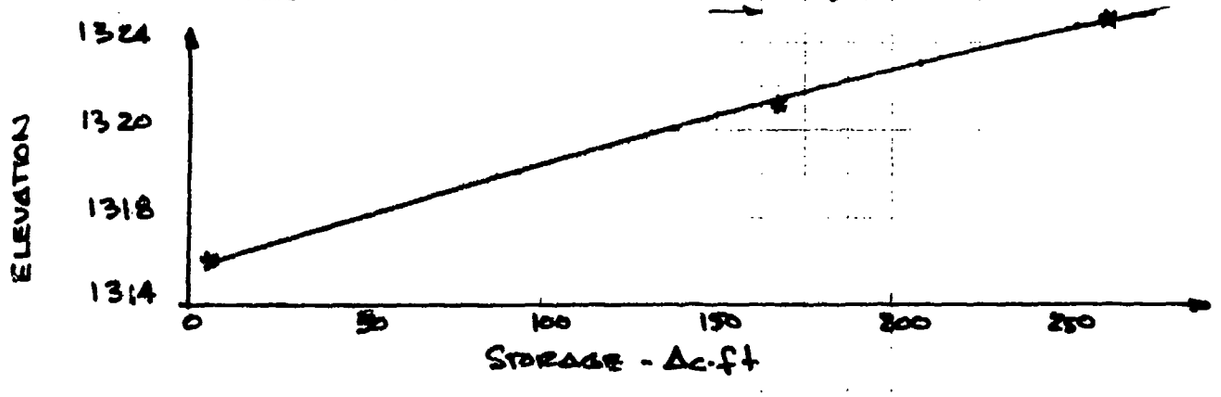
COMPUTED BY JPM DATE 5/81
CHECKED BY _____ DATE _____
SCALE _____

ESTIMATE EFFECT OF A FAILURE OF BAYLY DAM ON THE DOWNSTREAM QUARNO DAM.

QUARNO DAM NDI ID PA 00416 - INSP. BY BERGER ASSOC. 1981
HIGH HAZARD DAM
DR. AREA = 0.43 mi²

DATA FROM BERGER REPORT

	Elev.	Disch.	Storage
Normal Pool	1316.0	-	6 ac-ft
Emerg. Spwy	1320.5	40 cfs	(168) interpolated
Top Dam	1324.7	861 cfs	259 ac-ft.
½ PMF Stage	1322.5		(206)
1.0 PMF Stage	1324.4		(252)



PREMISE NO 1 - If Bayly dam were to fail the failure would be at the dike which is 1' lower than the dam itself. THE BOTTOM OF THE BREACH WOULD BE EL. 1391 AND THE RELEASE VOLUME WOULD BE 36 Ac ft*

* 51 (MAX POOL) - 15 (STORAGE AT EL. 1391)

PREMISE NO. 2 - As Quarno Dam has 91 ac.ft storage available above the emergency spillway crest, a dam break analysis of Bayly when routed through Quarno would not overtop Quarno if it were conducted as per the C.O.E. guidelines ... ie no additional inflow from the downstream drainage area.

Note that sufficient storage (53 acft) is available if the Quarno Dam is at the 1/2 PMF peak stage also.

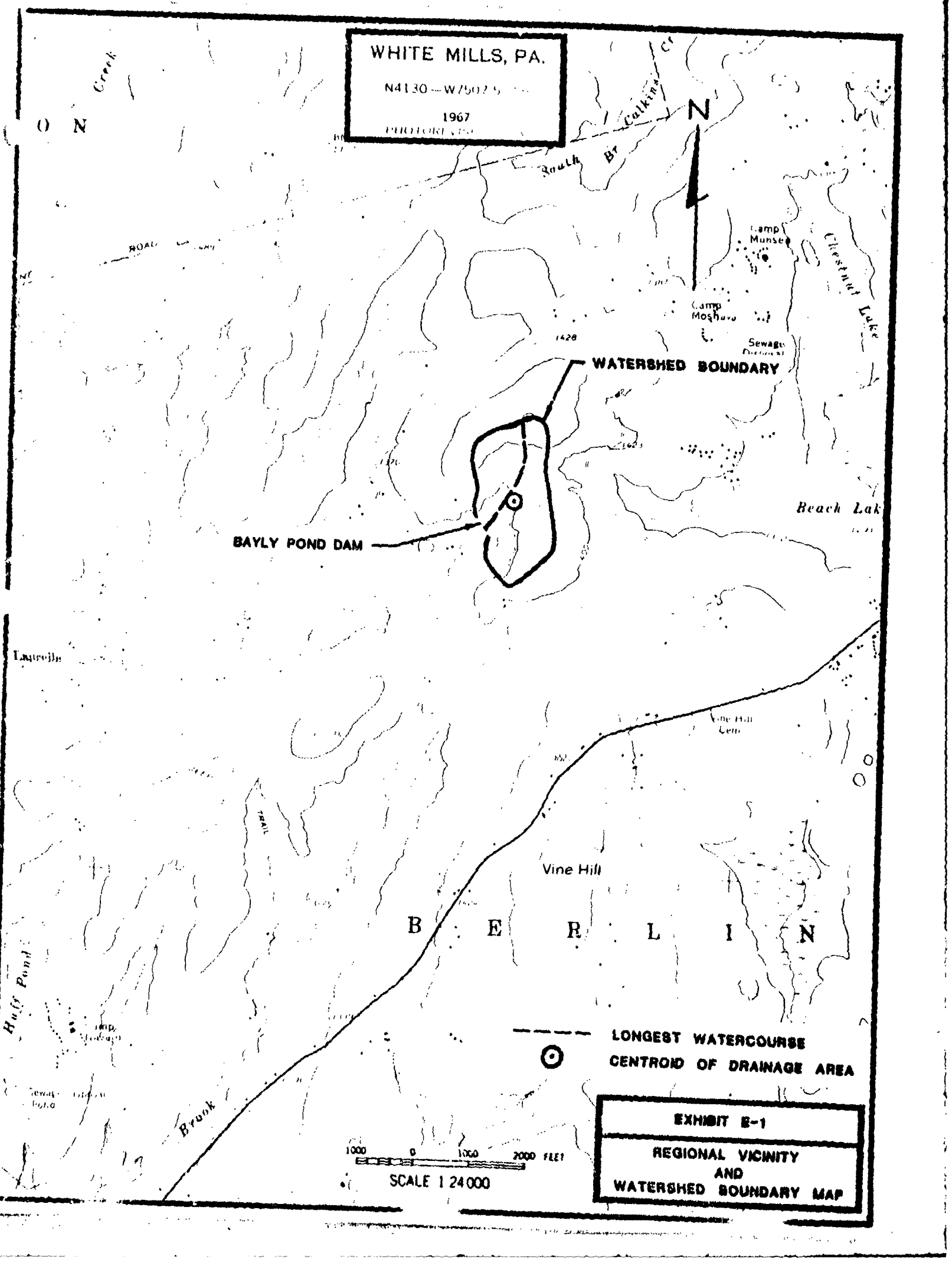
PREMISE NO. 3 - Overtopping of Quarno Dam by a breach of Bayly could only occur if the time of breach coincides with the peak inflow to Quarno from the drainage area outside of Bayly's. AND would only occur for flows near the full PMF.

Conclusion - A breach of Bayly dam would not cause overtopping of Quarno Dam

AND the "significant Hazard" Classification for Bayly is appropriate

APPENDIX E

EXHIBITS


WHITE MILLS, PA.
N4130—W7502.5
1967
PHOTOREVISED
WATERSHED BOUNDARY
BAYLY POND DAM
LONGEST WATERCOURSE
CENTROID OF DRAINAGE AREA
1000 0 1000 2000 FEET
SCALE 1 24000
EXHIBIT E-1
REGIONAL VICINITY
AND
WATERSHED BOUNDARY MAP
Camp Munsee
Camp Moshava
Chestnut Lake
Beach Lak
Vine Hill
B E R L I N
Huff Pond
Brook

APPENDIX F

GEOLOGY

BAYLY POND DAM

APPENDIX F

GEOLOGY

Bayly Pond Dam and reservoir area are located within the Glaciated Allegheny Plateau Section of the Applachian Plateaus Physiographic Province. Deposits of glacial drift of variable thickness cover the entire area. The drift was deposited by the Wisconsin Ice Sheet during the Pleistocene period of geologic time.

The glacial drift is composed primarily of till which is a reddish brown, unsorted compact mixture of clay, silt, sand, gravel, and cobbles with occasional boulder sized pieces. The stone pieces are sub-angular to rounded and consist mainly of sandstone and siltstone derived from the Catskill formation, the dominant rock formation in the area. The clay content and compact nature of the till makes it a relatively impervious soil type.

Some deposits of glacial outwash are also found in the area. The outwash is composed of loose, poorly sorted to stratified deposits of silt, sand, and gravel. The outwash deposits are generally very pervious.

Other loose pervious soils in the area are the recent deposits of alluvial silt, sand, and gravel with some clay. These soils are localized and limited to streambeds and flood plain areas.

The bedrock underlying the entire dam and reservoir area is the Catskill Formation of the Susquehanna Group. This group of formations is of Upper Devonian age. The Catskill Strata generally consists of well-indurated red shale, siltstone, and fine sandstone with some gray, green, and brown shale, siltstone, and sandstone layers. Occasional conglomeratic layers are encountered. The red shales are the dominant lithology and the residual soils derived from this rock are usually high in clay and silt and contain numerous flaky and angular fragments and flat, slabby boulders. The area between the main dam and the dike is covered with many such flat, slabby boulders.

The regional structure of the bedrock in the area indicates that the bedrock underlying the dam and reservoir area is near-horizontal. The regional strike of the strata is northeast-southwest.

Although depth to the bedrock at the dam site is unknown, the steep excavated earth channel below the road culvert downstream of the dam indicates at least 6 feet of overburden soil in the area.

Ref.: Ground Water of Northeastern Pennsylvania, Stanley W. Lahman 1937, Bulletin W-4, Pennsylvania Geologic Survey.

0 1 2 3 4 5 10 MILES

SCALE: 1" = 4 MILES

LEGEND

DEVONIAN

UPPER

CENTRAL AND EASTERN PENNSYLVANIA

Dow — **Oswayo Formation**
Brownish and greenish gray, fine and medium grained sandstones with some shales and scattered calcareous lenses; includes red shales which become more numerous eastward. Relation to type Oswayo not proved.

Dck — **Catskill Formation**
Chiefly red to brownish shales and sandstones, includes gray and greenish sandstone tongues named Elk Mountain, Honesdale, Shohola, and Delaware River in the east.

Dm — **Marine beds**
Gray to olive brown shales, graywackes, and sandstones; contains "Chemung" beds and "Portage" beds including Burket, Brallier, Harrell, and Trimmers Rock; Tully Limestone at base.

Ds — **Susquehanna Group**

Barbed line is "Chemung-Catskill" contact of Second Pennsylvania Survey County reports; barbs on "Chemung" side of line.

NOTE:
GEOLOGIC MAP AND LEGEND OBTAINED FROM GEOLOGIC MAP OF PENNSYLVANIA BY PA. TOPOGRAPHIC AND GEOLOGIC SURVEY, DATED 1960

PHASE 1 INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

BAYLY POND DAM
GEOLOGIC MAP

GEO - Technical Services, Inc.
HARRISBURG, PA

JUNE, 1981

EXHIBIT F